

Commonwealth of Kentucky
Division for Air Quality
PERMIT STATEMENT OF BASIS

Title V Draft Permit No. V-05-011

WESTLAKE VINYL INC.

WESTLAKE VINYL CORPORATION

CALVERT, CITY, KENTUCKY

9/21/2007

Andrew True

Plant ID# 21-157-00039

AI # 2966

SOURCE DESCRIPTION:

North American Pipe Corporation, Westlake PVC Corporation, and Westlake Vinyls Incorporated are all subsidiaries of Westlake Chemical Corporation. The three facilities are located within a contiguous area. Even though the facilities have separate Title V permits, the facilities are a single major source, pursuant to 401 KAR 52:001 Section 1(45)(a) definitions. Each owner/operator is responsible and liable for their own violations, unless there is a joint cause for the violations. Westlake PVC Corporation and Westlake Vinyls Inc. are a single major source, as defined by 401 KAR 52:020, Title V Permits, and 401 KAR 51:017, Prevention of Significant Deterioration of Air Quality (PSD). The source has applied for permit renewal on December 20, 2004. This permit document covers only Westlake Vinyls Inc.

The Westlake Vinyls Plant is organized into four operational areas as follows: Chlor-Alkali Plant; Ethylene (Olefins) Plant; Energy & Environmental Operations; and the Monomer Plant. The Chlor-Alkali portion processes treated brine to produce chlorine, sodium hydroxide, and hydrogen gas using a membrane cell electrolyzer process. Chlorine Plant vent streams from process operations, including plant shutdowns, are collected and vented through the Sodium Hypochlorite Tower (EPN 813) and the Atmospheric Scrubber (EPN 877). HCl is produced by reacting chlorine with hydrogen and absorbing the HCl in water within the HCl Synthesis Scrubber (EPN 887). The primary function of the Olefins or Ethylene plant is to produce high purity ethylene through hydro-cracking of propane or ethane feedstock. The efficiency of the process depends to a great extent on the simultaneous recovery of useful and profitable co-products such as propylene, mixed butanes, aromatic gasoline, fuel oil, and fuel gas. The Energy & Environmental process unit provides utilities such as steam for the Westlake Vinyls plant and manages the wastewater treatment plants.

The Westlake Monomers plant produces vinyl chloride monomer through the thermal decomposition of 1,2 dichloroethane (EDC) to form vinyl chloride monomer (VCM) and hydrogen chloride (HCl). The pyrolysis reaction takes place at elevated temperature and pressure in a gas-fired furnace. The gaseous reaction products, together with any unconverted EDC, are rapidly cooled and partially condensed by quenching with cooled EDC liquid in a quench column. During the pyrolysis process some coke is formed. Coke on the furnace tubes is periodically removed and collected during the furnace decoking operations. Products then go through a series of distillation and recovery steps to recover the VCM. The EDC-VCM process consists of 8 main sections - EDC Thermal Cracking, VCM-HCl Distillation, Hydrogenation Reaction, EDC Oxychlorination Reaction, EDC Recovery, EDC High Temperature Reaction, EDC Distillation, and Catoxid Reaction. Vents from the EDC recovery section are scrubbed with cold circulating solvent to recover residual EDC, and the recovered EDC is returned to the EDC recovery section. Vent gas from the EDC recovery section is

fed to the Oxy Incinerator and/or the Primary Incinerator. Periodically, one of the incinerators must be temporarily taken out of service for maintenance. During these maintenance events, some of waste gas streams may be routed through the South Synthesis EDC Absorber.

The majority of VCM produced is piped directly to the Westlake PVC plant, and the remainder is sent out by pressurized railcars or cylinders. The emissions from the railcar loading are sent to EPN 453 and EPN 530, the Oxy and Primary Thermal Incinerators. Excess Hydrogen Chloride is removed from the furnace and sent back to the oxychlorination reactor to produce more EDC.

COMMENTS:

a. Types of control and efficiency:

There are several controls devices throughout the chlor-alkali plant; ethylene plant; energy and environmental plant; and the monomers plant:

EMISSION POINT NUMBER (EPN)	CONTROL DEVICE	POLLUTANT(S)	EFFICIENCY
813	Sodium Hypochlorite Tower	Chlorine	99.82%
877	Atmospheric Scrubber	Chlorine	99.82%
321	Ethylene Flare	HAPs, VOCs	99.8%
342	River Flare	HAPs, VOCs,	99.8%
449	South Synthesis EDC Absorber	HAPs, VOCs,	99.8%
453	Oxy Incinerator	HAPs, VOCs,	98%
524	Vinyl Chloride Flare	HAPs, VOCs,	99%
530	Primary Thermal Incinerator	HAPs, VOCs,	98%

The Current Title V permit establishes requirements and procedures that are enforceable as a practical matter; therefore in accordance with definition of PTE (401KAR52:001(56)), the PTE shall take into account the reductions achieved by the unit (PTE = controlled emissions).

Potential to Emit (PTE) was calculated using controlled emissions from the following control devices:

Ethylene Flare (EPN 321): Operation required by 40 CFR 60 NNN for distillation columns in Cymetech Plant, 40 CFR 63 Subpart SS for closed vent systems, and 40 CFR 63 Subpart YY for ethylene manufacturing.

River Flare (EPN 342): Integral for personnel exposure purposes (benzene from aromatic gas barge loading operations). The only acceptable alternative to the flare would be to vent this intermittent vent stream high enough to reduce ground concentrations of benzene to less than 1ppm (OSHA PEL) on the plant grounds. Alternatively, the River Flare is used as a back-up for the Ethylene flare to control the off-gases from the Ethylene Wastewater Pre-treatment facilities.

Oxy Incinerator (EPN 453): This unit controls normal process vents and produces steam as a

desirable byproduct (of which is required for plant process operations). In the absence of the incinerator, for personnel protection reasons, some other device would have to be used to be protective for workers, and another steam generation unit would be required to supply the steam.

Primary Incinerator (EPN 530): This unit controls normal process vents and combusts fuel gas and produces muratic acid and steam as desirable byproducts (both are required for plant operations). In the absence of the incinerator, for personnel protection reasons, some other device would have to be used to be protective for workers and another steam generation unit would be required to supply the steam.

Hypo Tower (EPN 813): The operation of the Hypo Tower is integral for personnel exposure purposes. The Hypo Tower was installed with the construction of the Chlorine plant in the mid 1960s, well before any significant environmental concerns were being addressed. The primary function of this device is to protect the health and welfare of the workers.

HCl Synthesis Unit (EPN 887):

Vent is expected to emit hydrogen chloride (HCl) and chlorine (Cl₂). Emission rates of HAPs are estimated using design vent gas flow rate and design vent gas characteristic (based on manufacturer's specifications). The HCl absorber is integral to the production process and not a control device.

Atmospheric Scrubber (EPN 877): Integral for personnel exposure purposes for the same reasons as discussed for the Hypo Tower (above).

Absorber/Stripper (EPN 449): This unit is an integral recovery device that absorbs EDC (desirable intermediate) from the "Absorber Vent" and recycles the recovered material back to the process.

A&B Wastewater Strippers (EPN EE-4): Wastewater Strippers A&B will be treated as recovery devices and integral to the process due to the recovery and recycling of the EDC in the process.

East Cracking Decoke Pot (EPN 521), North Cracking Decoke Pot (EPN 519), and South Cracking Decoke Pot (EPN 520): The decoking pots are essentially a submerged vent scrubber used to control particulate emissions. Compliance with 401 KAR 61:020 particulate and opacity limits is demonstrated during periods of normal operation of the decoking pots.

Ethylene Primary Waste Water Treatment (EPN ET-1): The operation of the Ethylene Wastewater Treatment is integral from a process standpoint, in as much as this unit allows Westlake to maintain compliance with its KPDES permit. This unit is very important for the removal of contaminants (primarily benzene and semi-volatiles) from the Ethylene wastewater that cannot be sufficiently treated in the Secondary Wastewater treatment system without this pretreatment.

b. Emission Factors and Their Source:

A combination of AP-42 emission factors, material balance, and stack test data were used to estimate emissions: refer to the application for details.

- c. The following regulations apply to the Westlake chlor-alkali plant; ethylene plant; energy and environmental plant:
1. 401 KAR 61:015, *Existing Indirect Heat Exchangers*, applies to: EU#001 (EPN008) Boiler #1, EU#002 (EPN 010) Boiler #3, EU#003 (EPN 011) Boiler #4, and EU# 005 (EPN 305-311) Seven Propane Cracking Furnaces.
 2. 401 KAR 59:015, *New Indirect Heat Exchangers*, applies to EU #006 (EPN 327 and EPN 328) Two Propane Cracking Furnaces.
 3. 401 KAR 63:010, *Fugitive Emissions*, applies to the Salt Handling and Transfer Operations and the Cooling Towers (EPN 052, 364, 849, 801, 853).
 4. 401 KAR 63:020, *Potentially Hazardous Matter or Toxic Substances*, applies to the emissions of chlorine from the Sodium Hypochlorite Tower (EPN 813), Membrane Cell Room Ventilation (EPN 852), HCl Synthesis Scrubber (EPN 887) and Atmospheric Scrubber (EPN 877). While there is not a specific limit for chlorine emissions, the permittee is required to continue using the scrubbers to control chlorine emissions since the permittee has relied upon the controlled emission rates to avoid review under 401 KAR 63:021 and 63:022 in the past. 401 KAR 63:020 also applies to the chlorine and hydrogen chloride emissions from EU# 18 EPN (FUG-CA-1) Chlor-alkali plant CL₂/HCL Fugitives and EU# 020 EPN (FUG-CA-2) Chlor-alkali Plant HAP Fugitives.
 5. 401 KAR 63:015, *Flares*, applies to EU# 007 (EPN 321) Ethylene Flare and EU# 008 (EPN 342) River Flare.
 6. 401 KAR 59:095, *New Oil-Effluent Water Separators*, applies to the Ethylene Wastewater Pre-treatment Plant (EPN ET-1), which includes to the following tanks: TK-192A; TK-192B; TK-194A; TK-194B; and TK-194C.
 7. 401 KAR 60:005, which incorporates by reference federal regulation 40 CFR 60 Subpart Kb, *Standards of performance for volatile organic liquid storage vessels*, applies to the Equalization Tank TK-191 at the Ethylene Plant.
 8. 401 KAR 60:005, which incorporates by reference federal regulation 40 CFR 60 Subpart NNN, *Standards of performance for VOC emissions from synthetic organic chemicals manufacturing industry distillation operations*, applies to the distillation columns in the Cymetech plant which are vented to the Ethylene Flare EU#007 (EPN 321).
 9. 401 KAR 57:002, which incorporates by reference federal regulation 40 CFR 61 Subpart FF, *National Emission Standard for Benzene Waste Operations*, applies to the Ethylene Wastewater Pre-treatment Plant (EPN ET-1), which includes the following tanks: TK-191; TK-195; TK-196; TK-198A; TK-198B; TK-201; TK-202; TK-211 and oil water separators TK-192A, TK-192B, TK-194A, TK-194B, and TK194-C, by reference from 40 CFR 63.1091 (40 CFR 63 Subpart XX); and TK-1850. Federal regulation 40 CFR 61 Subpart FF is applicable to EU#028 (EPN EE-5), Activated Sludge Biotreatment System/Secondary Water Treatment System at the Energy and Environmental Plant. Federal regulation 40 CFR 61 Subpart FF is also applicable to (FF-1) Plant-wide Uncontrolled Benzene Emissions. Pursuant to 40 CFR 61.342 (b), each owner or operator of a facility at which the total annual benzene quantity from facility waste is equal to or greater than 10 Mg/yr (11 ton/yr), as determined in 40 CFR 61.342 (a), shall be in compliance with the requirements of paragraphs (c) through (h) of 40 CFR 61.342 (e). The facility will comply with 40 CFR 61.342 (e), as an alternative to the requirements in 40 CFR 61.342 (c) and (d), by managing and treating the facility waste, so that the benzene quantity in waste \geq 10% flow-weighted average water content is equal to or less than 6 Mg/yr, as determined by 40 CFR 61.355(k).

10. 40 CFR 61 Subpart V, *National Emission Standard for Equipment Leaks (Fugitive Emission Sources)* applies to equipment in benzene service within EU#025 (EPN FUG-ETH-YY) Ethylene Plant Fugitives Subject to MACT YY. Pursuant to 40 CFR 63.1100(g)(4), equipment that must be controlled by 40 CFR 63 Subpart YY and 40 CFR 61 V or 40 CFR 60 VV is required only to comply with the equipment leak requirements of 40 CFR 63 Subpart YY, which references 40 CFR Subpart UU.
11. 401 KAR 63:002, which incorporates by reference federal regulation 40 CFR 63 Subpart G, *National Emission Standard for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater*, applies to the Storm-water/Wastewater Storage Tanks (EPN 445 and 446), and EU#032 (EPN EE-4) EDC Recovery Column.
12. 401 KAR 63:002, which incorporates by reference federal regulations 40 CFR 63 Subpart YY, *National Emission Standard for Ethylene Manufacturing*, applies to storage tanks 332A & 332B. Pursuant to 40 CFR 63.1103(e)(1)(i)(A), 40 CFR 63 Subpart YY is applicable, but there are no applicable requirements in 40 CFR 63.1103 Table 7, due to tank size and vapor pressure of contents. Aside from 40 CFR 63 Subpart YY *National Emission Standard for Ethylene Manufacturing*, applicability, EPN 332A & 332B are considered insignificant activities. No emission unit number (EU#) has been assigned to these storage tanks within the emissions inventory database.

401 KAR 63:002, which incorporates by reference federal regulations 40 CFR 63 Subpart YY applies to EU# 005 (EPN 305-311) and EU#006 (EPN 327-328) propane cracking furnaces. The cracking furnaces are part of the affected source pursuant to 40 CFR 63.1103(e)(1)(ii)(J), but there are no applicable requirements in 40 CFR 63 Subpart YY.

40 CFR 63 Subpart YY, *National Emission Standard for Ethylene Manufacturing*, applies to EU#021 methanol storage tank TK-932 (EPN 318); The Ethylene Wastewater Pre-Treatment Plant (ET-1); EU# 022 Gasoline Storage Tanks TK-904A (EPN 319); plantwide uncontrolled benzene emissions (EPN FF-1); No. 4 Cooling Tower (EPN 364); EU #025 Ethylene Plant Fugitives Subject to MACT YY (EPN FUG-ETH-YY); and EU #007 Ethylene Flare (EPN 321).

13. 401 KAR 63:002, which incorporates by reference federal regulations 40 CFR 63 Subpart WW, *National Emission Standard for Storage Vessels (Tanks) Control Level 2*, applies to EU#022 Gasoline Storage Tanks TK-904A (EPN 319) and TK-904B (EPN 320).
14. 401 KAR 63:002, which incorporates by reference federal regulation 40 CFR 63 Subpart F, *National Emission Standard for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry*, applies to the No. 3 Cooling Water Tower EU# 027 (EPN 052).
15. 401 KAR 63:002, which incorporates by reference 40 CFR 63 Subpart A (General Provisions) and SS (*National Emission Standards for Closed Vent Systems, Control Devices, Recovery Devices, and Routing to a Fuel Gas System*), applies to the ethylene flare (EPN 321).

16. 40 CFR 63 Subpart UU *National Emission Standard for Equipment Leaks- Control Level 2 Standards* (Referenced by 40 CFR 63 Subpart YY) applies to EU#025 (EPN FUG-ETH-YY) Ethylene Plant Fugitives Subject to MACT YY.
17. 40 CFR 63 Subparts XX, *National emission standard for ethylene manufacturing, process units: heat exchange systems and waste operations*, applies to the Ethylene Wastewater Pre-treatment Plant (EPN ET-1) by reference in 40 CFR 63 Subpart YY [40 CFR 63.1103(e)(3)(g)(1)(i)]. 40 CFR 63 Subparts XX is also applicable to No. 4 Cooling Water Tower (EPN 364).
18. 40 CFR 60 Subpart A, General Provisions, applies to River Flare (See **B.8, Alternate Operating Scenarios**).

- d. The following regulations apply to significant emission units at the monomers plant:
1. 401 KAR 63:002, which incorporates by reference federal regulation 40 CFR 63 Subpart G, *National Emission Standard for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater*, applies to EU# 030 (EPN 438, EPN 454, and EPN 455), EDC Shore Tanks No. 1, 5, and 6; EU# 032 (EPN 439, EPN 734, EPN 735, EPN 736, and (EPN TK-30-B2), EDC Shore Tanks No. 2, 7, 8, 9, and Vacuum Column Feed Tank; EU# 039 (EPN TK-33-B2) South Synthesis Solvesso Tank; EU#031 (EPN 449), South Synthesis EDC Absorber (High Point Vent); EU #032(EPN 453), Oxy Incinerator; and EU #033(EPN 530) Primary Thermal Incinerator.

40 CFR 63.105, *Maintenance Wastewater Requirements*, applies to EU# 032 North/South Cracking Sump Tank (EPN 441) and East Cracking Sump Tank (EPN 442) for maintenance wastewater containing organic HAPs listed in Table 9 of 40 CFR 63 Subpart G.
 2. 401 KAR 63:002, which incorporates by reference federal regulation 40 CFR 63 Subpart H, *National emission standard for organic hazardous air pollutants for equipment leaks*, applies to EU# 036 (EPN FUG-MON-H) Monomers Plant Fugitives Subject to MACT H.
 3. 401 KAR 63:002, which incorporates by reference federal regulation 40 CFR 63 Subpart F, *National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry*, applies to EU# 032 North/South Cracking Sump Tank (EPN 441) and (EPN 442) East Cracking Sump Tank, EU# 035 (EPN 457) South Synthesis Cooling Tower, EU# 037 (EPN 458) East Cracking Cooling Tower, and EU# 038 (EPN 459) South Cracking Cooling Tower, and EU #036 (EPN-FUG-MON-H) Monomer Plant Fugitives Subject to MACT H. 40 CFR 61 Subpart F also applies to EU#032 the Oxy and Primary Thermal Incinerators (EPN 453 and EPN 530). However, pursuant to 40 CFR 63.110(f), the permittee is only required to comply with the provisions of 40 CFR 63 Subpart G.
 4. 401 KAR 59:015, *New Indirect Heat Exchangers*, applies to EU# 010 South Cracking Furnace #13 (EPN 514 A/B), EU# 011 North Cracking Furnace 1A (EPN 526), EU# 011 North Cracking Furnace 2A (EPN 527), EU# 012 EDC Cracking Furnace #3 (EPN 534), EU# 012 EDC Cracking Furnace #4 and (EPN 535).
 5. 401 KAR 61:020, *Existing Process Operations*, applies to EU# 034 (EPN 519, EPN 520, and EPN 521), North, South, and East Decoking Pots.
 6. 401 KAR 63:015, *Flares*, applies to EU# 009 (EPN524), Vinyl Chloride Flare.
 7. 401 KAR 60:005, which incorporates by reference federal regulation 40 CFR 60 Subpart VV, *Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry*, applies to EU# 036 (EPN FUG-MON-H) Monomers Plant Fugitives Subject to MACT H.

8. 401 KAR 57:002, which incorporates by reference federal regulation 40 CFR 61 Subpart V, *National Emission Standard for Equipment Leaks*, applies to EU# 036 (EPN FUG-MON-H) Monomers Plant Fugitives Subject to MACT H.
Note - For the purposes of this permit, the requirements of 40 CFR 60 Subpart VV, 40 CFR 61 Subparts F and V, and 40 CFR 63 Subpart H have been streamlined as provided in U.S. EPA White Paper Number 2 (March 5, 1996) on Part 70 Operating Permits. As a result, to satisfy the requirements of the four applicable regulations for pipeline equipment, the permittee is only required to comply with 40 CFR 63 Subpart H for EU# 036 (EPN FUG-MON-H) Monomers Plant Fugitives Subject to MACT H. All pipeline equipment in VOC, VHAP or vinyl chloride service shall be considered, for purposes of applicability and compliance with Subpart H, as if it were in organic hazardous air pollutant (HAP) service. Compliance with Subpart H shall be deemed to constitute compliance with Subparts VV, F, and V.
9. 401 KAR 63:010, *Fugitive Emissions*, applies to EU# 035 (EPN 457) South Synthesis, EU# 037 (EPN 458) East Cracking, and EU# 030 (EPN 459) South Cracking Cooling Towers.
10. 40 CFR 60 Subpart Ka, *Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978 and Prior to July 23, 1984*, applies to EU# 030 the No. 1 (EPN 438), No. 5 (EPN 454), and No. 6 (EPN 455) EDC Shore Tanks.
11. 40 CFR 60 Subpart Kb, *Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984* is applicable to EU# 032 No. 7 EDC Shore Tank (EPN 734), No. 8 EDC Shore Tank (EPN 735), and No. 9 EDC Shore Tank (EPN 736). Pursuant to 40 CFR 63.110(b)(1), *Overlap with other regulations for storage vessels*. (1) After the compliance dates specified in 40 CFR 63.100 of 40 CFR 63 subpart F, a Group 1 or Group 2 storage vessel that is also subject to the provisions of 40 CFR part 60, subpart Kb is required to comply only with the provisions of 40 CFR 63 subpart G.
12. 40 CFR 60 Subpart A General Provisions, applies to EU# 009 (EPN 524) Vinyl Chloride Flare (EPN 524). If the flare is used as a control device to comply with 40 CFR 61 Subpart F, National Emission Standards for Vinyl Chloride, then the permittee shall comply with 40 CFR 60.18 (d) and 40 CFR 60.18(f)(2) in accordance with 40 CFR 61.65(d)(2)(i).

e. Additional Unit Information

BOILERS

An analysis of boilers #1, 3, and 4 was performed since the last Title V permit was issued. Per the Title V renewal application's "List of Requested Changes" Westlake has requested that the capacities for boilers #1, 3, and 4 be revised to represent corrected capacities. Boiler #1 (EPN 008) capacity has been revised to 161.2 million British thermal units per hour (mmBtu/hr). Boiler #3 (EPN 010) capacity has been revised to 130.64 mmBtu/hr. Boiler #4 (EPN 011) capacity has been revised to 125 mmBtu/hr. Per "List of Requested Changes," plant fuel gas is the only fuel. Note: although boiler capacities have changed, no modifications have been reported or filed with the Division of Air Quality. Due to correction of capacities, emission limits for sulfur dioxide and particulate matter were evaluated. Emission limits were calculated using the methods described in 401 KAR 61:015, *Existing indirect heat exchangers*. Since no modifications were reported, the Division included all units which were existing at the time that the emission limits were established (including Boiler #2 which has since been removed) and revised the capacities of boiler #1, 3, and 4, as requested, to calculate the facility's total capacity. After further research, Division records show that the particulate emissions were bubbled at the time emission limits were established, with increased allowable emissions for the coal fired boiler and gas-fired boilers reduced accordingly. This was determined at the time to be equivalent to that allowed by 401 KAR 61:015. Although the coal-fired boiler has been removed, the permitted emission limits for particulate matter established still apply to boilers #1, 3, and 4.

The Division's records also show that sulfur dioxide allowable limits were established based on dispersion modeling and were set at the current permitted level to insure compliance with the ambient air quality standards. The 4.0 lbs/mmBtu allowable limit specified in regulation 401 KAR 61:015 was predicted to result in exceedances of ambient air quality standards. Based on the authority found in 401 KAR 50:060, Section 4(2), the Division advised BFG by letter, dated February 29, 1980, that the sulfur dioxide allowable was reduced to 0.33 lb/mmBtu. This permit limit still applies to Boilers #1, 3, and 4.

VACUUM COLUMN FEED TANKS

As indicated in the Title V renewal application, the Vacuum Column Feed Tanks 1 and 2 (EPN 450 and 451), located in the Monomers Plant, were taken out of service and removed from the permit.

ETHYLENE PLANT FUGITIVES

Prior to the compliance date of July 12, 2005, as specified in 40 CFR 63.1102, Ethylene Fugitives were subject to 40 CFR 61 Subpart V. Pursuant to 40 CFR 1100(g)(4) *Overlap of subpart YY with other regulations for equipment leaks*, after the compliance date of July 12, 2005, as specified in 40 CFR 63.1102, equipment that must be controlled according to 40 CFR 63 Subpart YY and 40 CFR part 60, subpart VV, or 40 CFR part 61, subpart J or subpart V, is required only to comply with the equipment leak requirements of 40 CFR 63 Subpart YY. Therefore the Emission Unit (FUG-ETH-V) Ethylene Plant Fugitives Subject to NESHAP V and its requirements have been removed from the Title V renewal permit and replaced with (FUG-ETH-YY) Ethylene Plant Fugitives subject to MACT YY.

ETHYLENE WASTEWATER PRE-TREATMENT PLANT

40 CFR Subpart FF is applicable to the Ethylene Wastewater Pre-treatment Plant (EPN ET-1) by

reference from 40 CFR 63 Subpart XX, referenced by 40 CFR 63 Subpart YY. The facility will comply with alternative emission limitation in 40 CFR 61.342(e) by complying with 40 CFR 61.342(e)(2)(i) so that the benzene quantity for the wastes is equal to or less than 6 Mg/yr (6.6 tons/yr). The facility must also comply with 40 CFR 61.342(e) by complying with 40 CFR 61.342(e)(1) for facility wastes with a flow weighted annual average water content of less than 10% in accordance with 40 CFR 61.342(c)(1), which references 40 CFR 61.348(a). The facility does not have to comply with the 10 ppmw benzene concentration limit in 40 CFR 61.348(a), for facility wastes with a flow-weighted annual average water content greater than 10% (aqueous wastes). Facility wastes with flow-weighted annual average water content less than 10% (non-aqueous wastes) shall comply with 40 CFR 61.348(a).

CHLOR-ALKALI PLANT FUGITIVES

40 CFR 63 FFFF, *National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing*, is not applicable to (EPN FUG-CA-1) or (EPN FUG-CA-1). Pursuant to 40 CFR 63.2435(b), a miscellaneous organic chemical manufacturing process unit (MCPU) includes equipment necessary to operate a miscellaneous organic chemical manufacturing process, as defined in 40 CFR 63.2550, that satisfies all of the conditions specified in 40 CFR 63.2435 (b)(1) through (3). According to 40 CFR 63.2435 (b)(1), the MCPU must produce material or family of materials that is described in to 40 CFR 63.2435 (b)(1)(i), (ii), (iii), (iv), or (v). Pursuant to 40 CFR 63.2435(c)(5), production activities described using the 1997 version of NAICS codes 325181 are exempt as specified in 40 CFR 63.2435(b)(1)(i) and (ii), and therefore are not subject to the requirements of 40 CFR 63, Subpart FFFF.

40 CFR 61 Subpart V, *National Emission Standard for Equipment Leaks (Fugitive Emission Sources)* is not applicable to EU #018 (EPN FUG-CA-1) and EU #020 (EPN FUG-CA-2). The provisions of 40 CFR 61 Subpart V apply to the sources listed in 40 CFR 61.240(a) after the date of promulgation of a specific subpart in part 61. [40 CFR 61.240(b)].

40 CFR 60 Subpart VV, *Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry*, is not applicable to EU #018 (EPN FUG-CA-1) and EU #020 (EPN FUG-CA-2). 40 CFR 60 Subpart VV applies to facilities with process units, components assembled to produce, as intermediate or final products, one or more of the chemicals listed in 40 CFR 60.489. The Chlor-Alkali Plant produces chlorine, sodium hydroxide, hydrochloric acid, and hydrogen gas: none of which are listed in 40 CFR 60.489. The Chlor Alkali Plant Fugitives (EPN FUG CA-2) does emit carbon tetrachloride as a pollutant. However, the carbon tetrachloride is neither produced, nor used as an intermediate. It is a processing aid brought in from outside suppliers. Therefore, 40 CFR 60 Subpart VV does not apply to the Chlor-Alkali Fugitive Emissions.

INDIRECT HEAT EXCHANGERS

As defined in 401 KAR 59:015 Section 2(2) and 401 KAR 61:015 Section 2(2), an indirect heat exchanger is any piece of equipment, apparatus or contrivance used for combustion of fuel in which the energy produced is transferred to its point of usage through a medium that does not come in contact with or add to the products of combustion. The following units were reviewed and determined to be indirect heat exchangers: Seven Propane Cracking Furnaces EU#005 (EPN 305-311); Two Propane Cracking Furnaces EU# 006 (EPN 327-328); South Cracking Furnace #13 EU# 010 (EPN 514 A/B); North Cracking Furnace 1A EU# 011 (EPN 526); North Cracking Furnace 2A EU# 011 (EPN 527); EDC Cracking Furnace #3 EU#012 (EPN 534); and EDC Cracking Furnace #4 EU# 012 (EPN 535). In previous permits, these emission points were not listed as indirect heat exchangers and no emission limits had been assigned to the units. Based on the heat input capacities of the units, total heat input capacity of the facility's indirect heat exchangers, and individual construction dates, the appropriate regulations were applied and emission limitations were calculated. 401 KAR 59:015, *New Indirect Heat Exchangers*, applies to the South Cracking Furnace #13 EU# 010 (EPN 514 A/B), North Cracking Furnace 1A EU# 011 (EPN 526), North Cracking Furnace 2A EU# 011 (EPN 527), EDC Cracking Furnace #3 EU#012 (EPN 534), EDC Cracking Furnace #4 EU#012 (EPN 535), and Two Propane Cracking Furnaces EU# 006 (EPN 327-328). 401 KAR 61:015, *Existing Indirect Heat Exchangers*, applies to Seven Propane Cracking Furnaces EU#005 (EPN 305-311). Pursuant to 401 KAR 59:015 Section 4(1)(b), sources with a total heat capacity greater than or equal to 250 million British thermal units per hour (mmBtu/hr) shall not emit more than 0.1 pounds per million Btu actual heat input of particulate matter from an indirect heat exchanger. Pursuant to 401 KAR 59:015 Section 5(1)(b), sources with a total heat capacity greater than or equal to 250 million British thermal units per hour (mmBtu/hr) shall not emit more than 0.8 pounds per million Btu actual heat input of Sulfur Dioxide (SO₂) from an indirect heat exchanger. Pursuant to 401 KAR 61:015 Section 4, the particulate emission limitation were calculated for Cracking Furnaces EU#005 (EPN 305-311) using the method in Appendix A to 401 KAR 61:015. The particulate matter emission limit was determined to be 0.17 lb/mmBtu. Pursuant to 401 KAR 61:015 Section 5, the Sulfur Dioxide emission limit was determined to be 4.0 lb/mmBtu using the methods given in Appendix B to 401 KAR 61:015 for Class V sources pursuant to 401 KAR 50:025.

PERMIT REVISIONS

The following table includes a list of revision applications received by the Division since the renewal application, dated December 20, 2004. Minor revision and insignificant revision applications were approved, pursuant to 401 KAR 52:020, Section 14 for Title V.

Application Receiving Date	Revision Details
January 11, 2005	Minor Revision (APE20050001): Addition of insignificant activity, portable air compressor (EPN 040) to be used on an "as needed" temporary basis to perform maintenance on critical equipment in the energy and environmental unit.
January 11, 2005	Minor Revision (APE20050001): Increased the nominal surface area of the salt storage pile (EPN 801D) from 1 acre to two acres. The potential emission increase resulting from change is 0.22 tons per year PM.
February 25, 2005	Minor Revision (APE20050001): Cold Flare Vaporizer, TK-924,

	to vaporize cryogenic liquids to be burned in the ethylene flare.
March 9, 2005	Minor Revision (APE20050001): Addition of carbon bed unit and ancillary pipeline equipment used to remove iron contaminants from 1,2-Dichloroethane (EDC). Emissions will be fugitive in nature from valves, connectors, pumps, etc. The actual to potential emission increase will be 0.25 tons per year, which is under the significant threshold level. New piping will be subject to MACT subpart H monitoring requirements and will be incorporated into the plant's leak detection and repair program.
April 27, 2005	Minor Revision (APE20050001): To add seventy-two cells and a thirteenth (13 th) electrolyzer to the existing Membrane Cell Chlorine plant. The affected emission units include: EU# 013 (EPN 801A/B/C/D); EU#003 (EPN 011); EU# 017 (EPN 877); and EU#015 (EPN 852). There were no changes to the permit from the revision. The emission inventory system was updated for the affected emission units. The total potential emission increase did not trigger PSD.
June 13, 2005	Revision for Insignificant activity (APE20050001): Addition of Portable Air Compressor in the ethylene production facility.
August 19, 2005	Minor Revision (APE20050001): Replaced existing Regeneration Heater (H104), emission point no. 314, with a new, larger heater. The new heater will increase the current permitted heat duty rate of 2.70 mmBtu/hr to 5.28 mmBtu/hr. Emission point 314 is listed in the Title V Permit as an insignificant activity within the Ethylene production facility.
October 11, 2005	Minor Revision (APE20050003): Addition of a hydrochloric acid loading facility (EP-893) at the chlor-alkali plant to increase the shipment of the acid off-site; as an insignificant activity within the chlor-alkali plant.
October 13, 2005	Minor Revision (APE20050004): Addition of insignificant activity, Chemical Addition Tote Tank (EP-376) to the Ethylene Production Facility. Tank will be 330 gallons with vapor pressure less than 1.5 psia. Tank will be used to add fuel oil dehazing chemical aid to Ethylene fuel oil products.
November 10, 2005	Minor Revision (APE20050005): Group reclassification for the High Point Vent (EP-449) during start up, shutdown, malfunction of the Oxy-Incinerator to Group II after the stack test performed in May 2005.

November 17, 2005	Minor Revision (APE20050006): Replacement of the existing Equalization Tank (TK-191) with a pressurized tank in the Ethylene Wastewater Pre-treatment Plant containing benzene venting to ethylene flare. The tank is subject to 40 CFR 61 Subpart FF- Benzene Waste NESHAP.
December 19, 2005	Minor Revision (APE20060001): Replacement of South Cracking HCl Column with a new column with different design for better separation of HCl and EDC products. Emission increase did not exceed PSD significant revision levels.
December 22, 2005	Minor Revision (APE20060004): Option of storing vacuum feed to the No. 1 Shore Tank (EP- 438). The tank will continue to be regulated under HON NESHAP provision as per 40 CFR 63 Subpart G. The facility does intend to maintain the flexibility to store EDC in this tank at its discretion.
December 22, 2005	Minor Revision (APE20060002): Installation of an additional heat exchanger, identified as the JT Ethylene Heater (HE-185-188), between the Joule-Thompson (JT) Ethylene Recovery System and the JT Ethylene Compressor (CM-108). The purpose of the additional heat exchanger is to heat up the ethylene stream to 80° F. Emissions are fugitive and included in the Ethylene Plant Fugitives.
January 3, 2006	Minor Revision (APE20060003): To construct a new 15 ton per day Pressure Swing Adsorption (PSA) Oxygen Plant to meet additional oxygen demand. The oxygen separated in the PSA unit (EPN 474) will be used in place of liquid oxygen. The unit would be requiring 500 gpm of cooling water from the 1B cooling water tower. There will be insignificant amount of emission increase from the cooling water tower. The PSA Oxygen Plant is included in Section C; Insignificant activities in the permit. The application for minor revision refers to the PSA unit as EPN 473. However, the description, EPN 473, was already assigned to a Portable Internal Combustion Diesel Engine within the facility (listed in Section C; Insignificant activities in the permit). The PSA unit was then assigned the description EPN 474.

PERMIT REVISIONS (CONTINUED)

January 19, 2006	Minor Revision (APE20060005): To replace Primary Incinerator Absorber (controls for EU# 033, Primary Thermal Incinerator) with increased vent gas throughput but the same HCl removal efficiency. The new absorber would reduce VOC/HAP emissions from the primary Incinerator Absorber when the Oxy-Incinerator shuts down and major vent gases are diverted to the Primary incinerator. There would be no change in the applicable requirements as a result of the change.
March 6, 2006	Minor Revision (APE20060006): Project title: Demethanizer Retray Project, involves replacing Koch-Glitsch Flexi-trays with high efficiency stainless steel Koch-Glitsch Superfrac trays which would increase liquid loading and improve the separation efficiency of the column. Retray project would result in an increased ethylene production by 25 million pounds. Project cost would be less than 12.5% of total asset value of the Demethanizer. There are no additional emission units. There will be increased emissions from methanol and gasoline storage tanks, the ethylene flare, and river flare, due to higher ethylene production, but would not exceed PSD significant revision levels.
April 17, 2006	Revision for Insignificant activity (APE20060007): Portable internal combustion diesel engines (EP 473) in the South Synthesis production facility.
April 28, 2006	Minor Revision (APE20060006): Application is an addendum to the Demethanizer Retray Project. With the increased ethylene production, Quench tower (CL-101) following the demethanizer would be repacked and two new coolers to replace existing coolers (HE-108A & B) with higher duties. There would be no change of emissions due to the modification, except for 2000 lb/hr dilution steam to the Ethylene plant.
May 4, 2006	Minor Revision (APE20060008): Use of River Flare (EP-342) as an alternate emission control device for the waste vent for the Ethylene Plant Wastewater pretreatment unit when the ethylene flare would shutdown for maintenance purpose. The mode of operation expected maximum 45 days in a year. An alternative-operating scenario was added for EU# 003 (EPN 342) River Flare in the permit.

PERMIT REVISIONS (CONTINUED)

November 3, 2006	Off Permit Change (APE20060010): Addition of new unloading station to the existing rail siding facilities for unloading railcars of Intermediate feed stock for storage and processing. The new equipment is addressed in the existing fugitive monitoring program for EU# 036 (EPN FUG-MON-H), Monomer Plant Fugitives Subject to MACT H, in the permit.
January 31, 2007	Minor Revision (APE20070001): EU# 026 (049), Equalization Tank (TK-1850) has an external floating roof in place, so monitoring to comply with the exemption in 40 CFR 61.342 (c)(2) is not necessary. The permit was modified accordingly.
March 19, 2007	Minor Revision (APE20070004): Change in catalyst used in EU# 029 (EPN 407) Catoxid Reactor Startup Vent from 100% alumina to an alumina based chromium catalyst. No change in total emissions of particulate matter will result from this change. However, chromium (HAP) will be emitted (.0018 TPY).
July 5, 2007	<p>Minor Revision (APE20070005): Revision of Ethylene MACT Notification of Compliance Status (NCS) report submitted on December 19, 2005. Revisions to EMACT NCS include the following:</p> <ul style="list-style-type: none"> • Inclusion of table 2 to Subpart XX of Part 63, specifically, the information in 40 CFR 61.357(d)(1) and (d)(2). • Revised Appendix B, Storage Tanks, to change the "Subject to Emission Standard" applicability for Ethylene Storage Spheres and Propylene Storage Bullets from Yes to No. Vessels contain no Hazardous Air Pollutants and, therefore not applicable to EMACT emission standards. • Revising Appendix B, Storage tanks, to change the "Subject to Emission Standard" applicability for the Mixed C-4 Storage Spheres from Yes to No. Pressure vessels have an operating pressure design >204.9 kPa and, therefore, are not applicable to EMACT emission standards. • Revising Appendix B, Storage tanks, to change the "Primary Reason for Non-Applicability" for Fuel Oil Storage Tanks from Contains No HAP to HAP vapor pressure <3.4 kPa. Since these tanks store liquid having HAP vapor pressure <3.4 kPa, they are not subject to the EMACT emission standards. • Revising Appendix C, Transfer Racks, to change the "Subject to Emission Standard" applicability for Track 10, Spot 5 & 6 and Track 11, Spot 11 & 12 from No to Yes. The throughputs for these transfer racks have the potential to exceed 76 m³/day averaged over 30 consecutive days. Should the throughputs of these be exceeded, Westlake will comply with the requirements of 40 CFR 63.1105.

<p>July 5, 2007 (continued)</p>	<ul style="list-style-type: none"> Revising Appendix E, Heat Exchange Systems, to change the “Subject to Emission Standard” Applicability for the Quench Water Trim Cooler and Quench Water Coolers from No to Yes. Although these heat exchangers contain less than 5 weight percent HAP in the process side fluids, they are within the defined heat exchange system in the Ethylene production facility. Revising Appendix E, heat exchange systems, to change the “ Primary Reason for Non-Applicability” for the Propylene Compressor Condensers at JT Export Product Cooler from “<5% HAP” to “Contains No HAPs”. These heat exchangers contain no HAPs in the process side fluids and, therefore, are not applicable to the EMACT emission standards.
<p>August 8, 2007</p>	<p>Minor Revision (APE20070006): EPN 410 and 411 (listed as insignificant activities in Title V Permit) will be taken out of service permanently and replaced by relocating the existing strip out tank (TK-33-B2) and converting it to a Solvesso Tank within the Monomers Plant. The Solvesso Storage Tank (TK-33-B2) will be referred to as EPN 410.</p>
<p>October 5, 2007</p>	<p>Amendment to Title V application: No. 3 River tank (EPN 412) and No. 4 River Tank (EPN 413) changed to insignificant activities.</p>
<p>November 5, 2007</p>	<p>Minor Revision: (APE20070007) Addition of 3 electrolyzers to the existing Membrane Cell Chlorine Plant and the construction of a new cooling tower (CT-6). There will be an increase in potential emissions attributed to the addition of the electrolyzers and the cooling tower. No Emission limitations will be compromised. A PSD evaluation was performed for the affected emission points and the proposed changes are below PSD significance levels.</p>
<p>March 12, 2008</p>	<p>Minor Revision: (APE20080001) Addition of an insignificant activity described as “Sulfuric Acid Truck Loading” (EPN 826) at the Chlor-Alkali Plant. The 70% sulfuric acid, which is diluted from 93-98% during chlorine drying, will be loaded out of an existing storage tank into tank trucks for shipment off-site. Emissions associated with loading activities will be chlorine entrained in the sulfuric acid during chlorine drying operations. During loading operations, a vent hose will be attached to the truck and chlorine will be routed to the existing Sodium Hypochlorite Tower (EPN 813) where the chlorine will be destroyed. The only new emissions will be chlorine fugitives from new valves and connectors and will be less than 1,000 lb/year.</p>

PERIODIC MONITORING:

The specific monitoring requirements are listed in Section B of the permit. Highlights of the monitoring requirements for specific emission units are listed below.

EU# 014 (EPN 813) Sodium Hypochlorite Tower and EU# 017 (EPN 877) Atmospheric Scrubber:
The permittee shall continuously monitor/measure oxidation-reduction potential (ORP).

EU# 007 (EPN 321) Ethylene Flare:

In accordance with 40 CFR 63.987(c), the permittee shall install and maintain a device capable of continuously detecting that at least one pilot flame or the flare flame is present.

EU# 025(EPN FUG-ETH-YY) Ethylene Plant Fugitives Subject to MACT YY:

Leak detection and repair (LDAR) program shall comply with the monitoring requirements described in 40 CFR 63.1023.

(EPN ET-1) Ethylene waste water treatment plant:

The permittee shall monitor the benzene concentration in the aggregated waste stream exiting the Equalization Tank TK-1850 before it is fed to the Activated Sludge Biotreatment System at least monthly using the procedures specified in 40 CFR 61.355(c)(3) [40 CFR 61.354(b)(2)].

EU# 008 (EPN 342) River Flare:

Whenever waste gas is sent to the flare for combustion, the permittee shall daily monitor and record the flare for visible emissions and observe: color of the emissions; whether emissions were light or heavy; total duration of the visible emission incident; the cause of the abnormal emissions; and any corrective actions taken.

EU# 023 (EPN 364) No. 4 Cooling Water Tower:

The permittee shall conduct monthly cooling water monitoring for organic HAPs for 6 months, both initially and following completion of a leak repair and within 7 days after completing the repair. If no leaks are detected for the 6-month period, then monitoring shall be conducted quarterly thereafter until a leak is detected [40 CFR 63.1086(a), 63.1086(b), 63.1087(b)].

EU# 027 (EPN 052) No. 3 Cooling Water Tower:

Monitor cooling water HAP concentration quarterly using appropriate EPA method in 40 CFR Part 136 according to 40 CFR 63.104(b).

EU# 032 (EPN 453) Oxy Incinerator and EU# 033 (EPN 530) Primary Thermal Incinerator:

In accordance with 40 CFR 63.114(a) the permittee shall maintain, calibrate and operate according to manufacturer's specification, monitoring devices for the continuous measurement of:

- i. The temperature in the firebox of the incinerator;
- ii. pH of the scrubber effluent;
- ii. Liquid flow at the scrubber influent;
- iii. Pressure drop across the scrubber;
- v. Inlet gas flow (as per D.4.b.); and
- vi. Liquid/gas ratio (as per D.4.b.)

The permittee shall monitor the gas stream flow as described in the determination plan in accordance with 40 CFR 63.114(a)(4)(ii)(c) [40 CFR 63.114 (a)(4)(ii)]. The monitoring systems shall be reviewed on an annual basis for accuracy, as required in 40 CFR 63.103(c)(2)(iv).

EU# 009 (EPN 524) Vinyl Chloride:

Whenever waste gas is sent to the Vinyl Chloride Flare for combustion, the permittee shall maintain daily records of whether any air emissions were visible from the flare. If no visible emissions are observed, then no further observations or records are required. If visible emissions are observed, the permittee shall perform the following:

- i. The permittee shall perform a Method 9 reading for the flare. The opacity observed shall be recorded in the daily log. The reading shall be performed by a representative of the permittee certified in Visible Emissions Evaluations. The permittee shall maintain a list of all individuals that are certified Visible Emissions Evaluators and the date of certification.
- ii. The permittee shall observe and record in the daily log the following additional information regarding the flare:
 - (1) The color of the emissions;
 - (2) Whether the emissions were light or heavy;
 - (3) The total duration of the visible emission incident;
 - (4) The cause of the abnormal emissions; and
 - (5) Any corrective actions taken.

EU# 036 (EPN FUG-MON-H) Monomers Plant Fugitives Subject to MACT H:

Monitoring must be done in accordance with the LDAR requirements in 40 CFR 63 Subpart H, *National emission standard for organic hazardous air pollutants for equipment leaks*.

EU# 035 (EPN 457) South Synthesis Cooling, EU# 037 (EPN 458) East Cracking Cooling Tower, and EU# 038 (EPN 459) South Cracking Cooling Tower:

Monitor cooling water HAP concentration monthly for first 6 months and quarterly thereafter using appropriate EPA method in 40 CFR Part 136 according to 40 CFR 63.104(b).

OPERATIONAL FLEXIBILITY:

Not applicable

CREDIBLE EVIDENCE:

This permit contains provisions, which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.